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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/626,957	07/25/2003	Michael Sommer	W&B-INF-1852	3198
24131	7590	03/29/2004	EXAMINER	
LERNER AND GREENBERG, PA P O BOX 2480 HOLLYWOOD, FL 33022-2480			SOWARD, IDA M	
			ART UNIT	PAPER NUMBER
			2822	

DATE MAILED: 03/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/626,957

Applicant(s)

SOMMER, MICHAEL

Examiner

Ida M Soward

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pw

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-44 is/are pending in the application.
- 4a) Of the above claim(s) 22-44 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 8, 10, 11, 14, 15, 18-20 and 45 is/are rejected.
- 7) ☒ Claim(s) 5-7, 9, 12-13 16-17 21 and 46 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 7-25-03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to the application filed July 25, 2003.

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-21 and 45-46, drawn to an array configuration, classified in class 257, subclass 301.
- II. Claims 22-31, drawn to a method for fabricating an array configuration, classified in class 438, subclass 243.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). Unpatentability of the Group I invention would not necessarily imply unpatentability of the Group II invention, since the device of the Group I invention could be made by a process materially different from those/that of the Group II invention. In the instant case, diffusion process instead of an implantation process could have been used to obtain the same result.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

This application contains claims directed to the following patentably distinct species of the claimed invention: Figure 1 (a circuit structure, claims 1-19) and Figure 5 (an SRAM cell, claims 32-44).

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record

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showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

During a telephone conversation with Gregory L. Mayback on 2/25/04 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-21 and 45-46. Affirmation of this election must be made by applicant in replying to this Office action. Claims 22-44 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Objections

Claim 18 objected to because of the following informalities: "J" should have been removed from the end of the sentence in line 2. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 20 and 45 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In lines 8-10, 9-12 and 8-11, respectively, "layer structures disposed in said etching trenches, a function of the circuit structure resulting from an interaction of said layer structures disposed in said etching trenches", "layer structures disposed in said etching trenches, a function of the circuit structures resulting from an interaction of said layer structures disposed in said etching trenches" and "layer structures disposed in said etching trenches and forming a multiplicity of SRAM memory cells, a function of said SRAM memory cells resulting from an interaction of said layer structures disposed in said etching trenches" are vague and unclear.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

As best understood, claims 1 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Bryant (5,512,517).

(Figures 3, 6C, 8C and 9; cols. 4-5, lines 5-19 & 48-67 and 1-3 & 19-29, respectively) Bryant teaches a circuit structure, comprising: a silicon substrate 10 having at least two etching trenches 14 & 14A formed therein and defining a silicon

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block having sidewalls, the etching trenches etched out in a manner adjoining the sidewalls of the silicon block, the etching trenches disposed at angles with respect to one another prescribed by a form of the silicon block; and layer structures 22 & 26 disposed in the etching trenches of the circuit structure resulting from an interaction of the layer structures disposed in the etching trenches.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-4, 11, 14-15, 18-19 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bryant (5,512,517) as applied to claim 1 above, and further in view of Kenney (5,744,386).

Bryant teaches all mentioned in the rejection above. In regard to claim 3, Bryant further teaches a field-effect transistor formed within the etching trench and the silicon block, the field-effect transistors having a first diffusion region functioning as a first source/drain region and extending into the silicon block, a conductive gate region, and a second diffusion region functioning as a second source/drain region and extending into the silicon block, a conductive channel being formed between the first and second source/drain regions in dependence on a potential of the conductive gate region (Figure

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9). In regard to claim 18, Bryant teaches a polysilicon conductive structure (Figure 9).

In regard to claim 19, Bryant teaches semiconductor layer structures (Figure 9).

However, Bryant fails to teach layer structures including conductive structures disposed in the etching trench.

In regard to claim 2, Kenney teaches the layer structures including conductive structures 34, 36 & 38 disposed in the etching trench 18 (Figure 2; col. 4-6, lines 64-67, 1-67 and 1-11, respectively).

In regard to claim 4, Kenney further teaches regions 12 & 14 having at least one of different doping concentrations and different conductivity types are disposed within the silicon block (Figure 2).

In regard to claim 10, Kenney teaches an SRAM memory cell (col. 13, lines 47-55).

In regard to claim 11 and as best understood to claim 45, it is well known in the art that an SRAM is made of two flip-flops and a selection transistor.

In regard to claim 14, Kenney teaches a word line 32 disposed in the etching trenches, the selection transistor being activated by the word line (Figure 2)

In regard to claim 15, Kenney teaches the word line serving as the gate region of the selection transistor; and a gate oxide layer 40 disposed between the word line and the silicon block (Figure 2; col. 4-6, lines 64-67, 1-67 and 1-11, respectively).

Since Bryant and Kenney are from the same field of endeavor (trench circuit structures), the purpose disclosed by Kenney would have been recognized in the pertinent art of Bryant. Therefore, it would have been obvious to one having ordinary

skill in the art at the time the invention was made to modify the trench circuit structure as taught by Bryant with the trench circuit structure having conductive structures disposed in the etching trench and at least one of different doping concentrations and different conductivity types are disposed within the silicon block as taught by Kenney to develop new multiple device type trench structures which facilitate fabrication of extremely high density integrated circuits (col. 2, lines 21-24).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bryant (5,512,517) and Kenney (5,744,386) as applied to claims 2-4, 10 and 18-19 above, and further in view of Malhi et al. (5,225,697).

Bryant and Kenney teach all mentioned in the rejection above. However, Bryant and Kenney fail to teach a silicon parallelepiped. Malhi et al. teach a silicon parallelepiped (Figure 2, cols. 4 and 10, lines 33-48 and 9-14, respectively).

Since Bryant and Kenney are from the same field of endeavor (trench circuit structures), the purpose disclosed by Kenney would have been recognized in the pertinent art of Bryant. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the trench circuit structure as taught by Bryant and the trench circuit structure having conductive structures disposed in the etching trench and at least one of different doping concentrations and different conductivity types are disposed within the silicon block as taught by Kenney with the trench circuit structure having a silicon parallelepiped as taught by Malhi et al. to provide the trench structure with a convenient configuration (col. 10, lines 5-15).

Allowable Subject Matter

Claims 5-7, 9, 12-13, 16-17, 21 and 46 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents are cited to further show the state of the art with respect to trench circuit structures:

Blanchard (US 2002/0140028 A1)

Cao et al. (US 6,498,108 B2)

Chan et al. (US 6,252,277 B1)

Fujishima et al. (5,885,878).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ida M Soward whose telephone number is 571-272-1845. The examiner can normally be reached on Monday - Thursday, 6:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

IMS
March 17, 2004


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